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**(54)METHOD AND DEVICE FOR DIVISIONAL
INPUT OF DOCUMENT IMAGE**

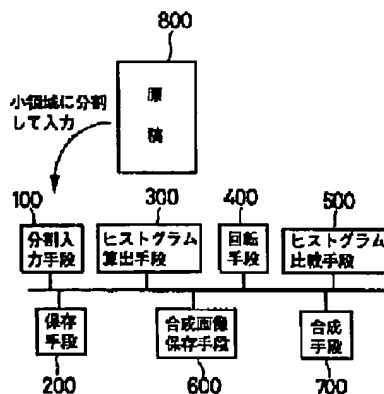
(57)Abstract:

PURPOSE: To automatically compose a document which is inputted as small divided areas if the output document of a printer, etc., is larger than an input means when the output document is inputted as a digital document image.

CONSTITUTION: A document 800 is divided into small areas and inputted from a divisional input means 100. Then, a histogram calculating means 300 generates a histogram of black pixels of the small areas and a rotating means 400 rotates the small-area digital document image data so that lines are separated, thereby correcting deviations of small areas at the time of the input. Then, a histogram comparing means 500 compares the histogram between adjacent small areas to detect the positional relation between the small areas. Then, a composing means 700 arranges the small-area digital document image data in a virtual two-dimensional space of a composite

image storage means 600 on the basis of the position relation to compose the document. Through the processes, the digital document image of the original document can automatically be composited from the small-area digital document images which are divided and inputted.

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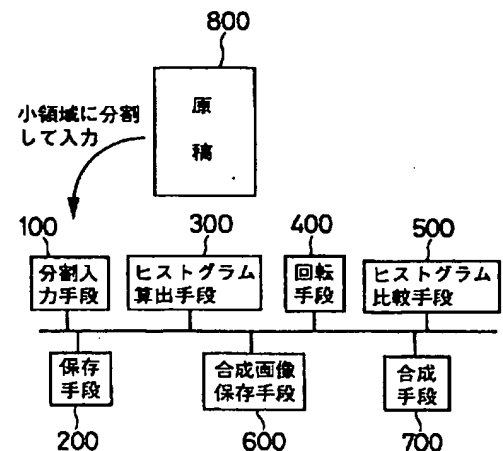
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(54) 【発明の名称】 文書画像の分割入力方法および装置

(57) 【要約】

【目的】 プリンタ等の出力原稿をデジタル文書画像として入力する際、原稿が入力手段より大きい時、小領域に分けて入力した原稿を自動合成する。

【構成】 まず、原稿800を分割入力手段100から小領域に分割して入力する。次に、ヒストグラム算出手段300によって小領域の黒画素のヒストグラムを取り、行が分離されるように回転手段400で小領域デジタル文書画像データを回転することにより、入力時の小領域のズレを補正する。次に、ヒストグラム比較手段500によって、隣接小領域間でのヒストグラムの比較を行い、小領域相互の位置関係を検出する。次に、合成手段700により、その位置関係に基づいて合成画像保存手段600の仮想2次元空間に小領域デジタル文書画像データを配置し合成する。以上の処理により、分割入力された小領域デジタル文書画像から元の原稿のデジタル文書画像を自動的に合成可能とする。



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【特許請求の範囲】

【請求項1】 あらかじめ出力装置から出力された原稿をデジタル文書画像データとして入力する方法において、

まず、原稿をデジタル文書画像データとして小領域に分割して入力し、

次に、前記入力した小領域デジタル文書画像データを入力した小領域毎に保存し、

次に、前記保存した小領域デジタル文書画像データの黒画素のヒストグラムを取り、

次に、前記ヒストグラムのパターンに基づいて前記小領域デジタル文書画像データを回転させてズレを補正し、

次に、前記ズレを補正した隣接小領域デジタル文書画像データ毎のヒストグラムを比較して相互の位置関係を検出し、

次に、前記位置関係に基づいて前記小領域デジタル文書画像データを仮想2次元空間に配置することを特徴とする文書画像の分割入力方法。

【請求項2】 ヒストグラムのパターンに基づいて小領域デジタル文書画像データを回転させてズレを補正する過程では、行を示すヒストグラムの幅が最小になるように前記回転を行うことを特徴とする請求項1記載の文書画像の分割入力方法。

【請求項3】 ズレを補正した隣接小領域デジタル文書画像データ毎のヒストグラムを比較して相互の位置関係を検出する過程では、各小領域デジタル文書画像データの隣接側の1行の黒画素ヒストグラム同士を行をずらしながら比較し、差が最小の行を探すことにより隣接小領域との位置関係を決定することを特徴とする請求項1記載の文書画像の分割入力方法。

【請求項4】 始めに、入力された小領域デジタル文書画像データが横書きであるか縦書きであるかを両方向のヒストグラムのうちで行が分離されている方向で判別し、該判別の結果に基づいて処理を開始することを特徴とする請求項1または請求項2または請求項3記載の文書画像の分割入力方法。

【請求項5】 あらかじめプリンタ等の出力装置から出力された原稿をデジタル文書画像データとして入力する装置において、

原稿をデジタル文書画像データとして小領域に分割して入力する分割入力手段と、

前記入力した小領域デジタル文書画像データを入力した小領域毎に保存する保存手段と、

前記保存された小領域デジタル文書画像データの黒画素のヒストグラムを取るヒストグラム算出手段と、

前記ヒストグラムのパターンに基づいて前記小領域デジタル文書画像データを回転させてズレを補正する回転手段と、

隣接小領域デジタル文書画像データ毎に算出されたヒ

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ストグラムを比較して隣接小領域デジタル文書画像データとの位置関係を検出する比較手段と、

前記位置関係に基づいて前記小領域デジタル文書画像データを仮想2次元空間に配置することにより合成する合成手段と、

前記仮想2次元空間を持ち前記合成されたデジタル文書画像データを保存する合成画像保存手段と、

を有することを特徴とする文書画像の分割入力装置。

【請求項6】 ヒストグラムのパターンに基づいて小領域デジタル文書画像データを回転させてズレを補正する回転手段は、行を示すヒストグラムの幅が最小になるように前記回転を行うことを特徴とする請求項5記載の文書画像の分割入力装置。

【請求項7】 ズレを補正した隣接小領域デジタル文書画像データ毎のヒストグラムを比較して相互の位置関係を検出する比較手段は、各小領域デジタル文書画像データの隣接側の1行の黒画素ヒストグラム同士を行をずらしながら比較し、差が最小の行を探すことにより隣接小領域との位置関係を決定することを特徴とする請求項1記載の文書画像の分割入力装置。

【請求項8】 入力された小領域デジタル文書画像データが横書きであるか縦書きであるかを両方向のヒストグラムのうちで行が分離されている方向で判別し、該判別の結果に基づいて各部の動作を開始させる文書方向判別手段を有することを特徴とする請求項5または請求項6または請求項7記載の文書画像の分割入力装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は、既にプリンタ等の出力装置に於いて出力された原稿をデジタル文書画像として入力するデジタル文書画像の分割入力方法および装置に関するものである。

【0002】

【従来の技術】 従来、画像処理等を目的に、既にプリンタ等の出力装置に於いて出力された原稿をデジタル文書画像として入力する場合、入力したい原稿が入力手段のサイズより大きいときは、入力手段で入力できる領域に分割して入力し、手作業により合成を行う必要があった。

【0003】

【発明が解決しようとする課題】 このような従来のデジタル文書画像の分割入力方法では、入力後に手作業で合成を行うため、手間と時間がかかるといった問題点があった。

【0004】 そこで本発明の目的は、従来技術の上記問題点を改善するため、小領域に分けて入力した原稿を自動的に合成する文書画像の分割入力方法および装置を提供することにある。

【0005】

【課題を解決するための手段】 上記目的を達成するた

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め、本発明の方法では、あらかじめ出力装置から出力された原稿をデジタル文書画像データとして入力する方法において、まず、原稿をデジタル文書画像データとして小領域に分割して入力し、次に、前記入力した小領域デジタル文書画像データを入力した小領域毎に保存し、次に、前記保存した小領域デジタル文書画像データの黒画素のヒストグラムを取り、次に、前記ヒストグラムのパターンに基づいて前記小領域デジタル文書画像データを回転させてズレを補正し、次に、前記ズレを補正した隣接小領域デジタル文書画像データ毎のヒストグラムを比較して相互の位置関係を検出し、次に、前記位置関係に基づいて前記小領域デジタル文書画像データを仮想2次元空間に配置する文書画像の分割入力方法を手段とする。

【0006】上記方法において、ヒストグラムのパターンに基づいて小領域デジタル文書画像データを回転させてズレを補正する過程では、行を示すヒストグラムの幅が最小になるように前記回転を行うのが、実現容易である。

【0007】また、上記方法において、ズレを補正した隣接小領域デジタル文書画像データ毎のヒストグラムを比較して相互の位置関係を検出する過程では、各小領域デジタル文書画像データの隣接側の1行の黒画素ヒストグラム同士を行をずらしながら比較し、差が最小の行を探すことにより隣接小領域との位置関係を決定するのが、実現容易である。

【0008】さらに、上記方法において、入力された小領域デジタル文書画像データが横書きであるか縦書きであるかを両方向のヒストグラムのうちで行が分離されている方向で判別し、該判別の結果に基づいて処理を開始させることが、文書の横書き／縦書きに対応可能にする上で好適である。

【0009】一方、本発明の装置では、あらかじめプリンタ等の出力装置から出力された原稿をデジタル文書画像データとして入力する装置において、原稿をデジタル文書画像データとして小領域に分割して入力する分割入力手段と、前記入力した小領域デジタル文書画像データを入力した小領域毎に保存する保存手段と、前記保存された小領域デジタル文書画像データの黒画素のヒストグラムを取るヒストグラム算出手段と、前記ヒストグラムのパターンに基づいて前記小領域デジタル文書画像データを回転させてズレを補正する回転手段と、隣接小領域デジタル文書画像データ毎に算出されたヒストグラムを比較して隣接小領域デジタル文書画像データとの位置関係を検出する比較手段と、前記位置関係に基づいて前記小領域デジタル文書画像データを仮想2次元空間に配置することにより合成する合成手段と、前記仮想2次元空間を持ち前記合成されたデジタル文書画像データを保存する合成画像保存手段と、を有する構成の文書画像の分割入力装置を手段とする。

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【0010】上記の装置において、ヒストグラムのパターンに基づいて小領域デジタル文書画像データを回転させてズレを補正する回転手段は、行を示すヒストグラムの幅が最小になるように前記回転を行うように構成するのが、実現容易である。

【0011】また、上記の装置において、ズレを補正した隣接小領域デジタル文書画像データ毎のヒストグラムを比較して相互の位置関係を検出する比較手段は、各小領域デジタル文書画像データの隣接側の1行の黒画素ヒストグラム同士を行をずらしながら比較し、差が最小の行を探すことにより隣接小領域との位置関係を決定するように構成するのが、実現容易である。

【0012】さらに、上記の装置において、入力された小領域デジタル文書画像データが横書きであるか縦書きであるかを両方向のヒストグラムのうちで行が分離されている方向で判別し、該判別の結果に基づいて各部の動作を開始させる文書方向判別手段を有するように構成するのが、文書の横書き／縦書きに対応可能にする上で好適である。

20 【0013】

【作用】本発明の文書画像の分割入力方法および装置では、入力手段よりも大きな原稿を小領域に分割して入力し、ヒストグラム算出手段等によって小領域の黒画素のヒストグラムを取り、回転手段等によって入力時の小領域のズレを補正し、ヒストグラム比較手段等によって隣接小領域間でのヒストグラムの比較を行い、小領域相互の位置関係を検出して合成画像保存手段等の仮想2次元空間に配置することにより、分割入力された小領域デジタル文書画像から元の原稿のデジタル文書画像を自動的に合成可能とする。

30 【0014】

【実施例】以下、本発明の実施例を、図面を参照して詳細に説明する。

【0015】図1に本発明の一実施例の構成を示す。図中の100は原稿800を小領域に分割して入力するための分割入力手段、200は小領域に分割して入力されたデジタル文書画像データを小領域毎に保存するための保存手段、300は入力されたデジタル文書画像データの黒画素のヒストグラムを取るためのヒストグラム算出手段、400は入力時のズレを補正するための回転手段、500は入力された隣接小領域間のヒストグラムを比較するためのヒストグラム比較手段、600は入力された小領域デジタル画像データを配置するための仮想2次元空間を持ち合成画像を保存するための合成画像保存手段、700は分割して入力された小領域デジタル文書画像データを仮想2次元空間に配置することによって分割して入力されたデジタル文書画像を隣接小領域デジタル画像データと合成する合成手段を表す。

【0016】本実施例は上記の構成により、原稿800を分割入力手段100により分割して入力された小領域

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のデジタル文書画像から元の原稿のデジタル文書画像を自動的に合成する事を最も主要な特徴とする。従来の技術とは、分割入力したデジタル文書画像を自動的に合成する点が異なる。

【0017】図2に本実施例の処理フロー図を示す。以下、その処理フローに従って本実施例を詳細に説明する。図3、図4はそのデジタル文書画像の入力処理を例示により説明する図である。

【0018】まず、分割入力手段100により原稿を小領域デジタル文書画像として入力する。次に、ヒストグラム算出手段300により小領域に分割して入力したデジタル文書画像のX方向の黒画素ヒストグラムを取る。図3(b)に示すように原稿を斜めにズレて撮影した場合には行間を示すヒストグラムの切れ目がない。これに対し、図3(a)に示すように正しく撮影した場合には行を示すヒストグラムが分離される。そこで、斜めにズレて撮影した場合にはヒストグラムの幅が最小になるように回転手段400により回転させて入力時のズレを補正する。以上の処理によって行の分離が可能となる。図3(b)の例示は極端な例であり、実際には例示しているほどにはずれていない場合もあるので、ヒストグラムの幅が最小になるように回転させる。

【0019】次に、上記処理によって可能となった行の分離を行い、それぞれの行についてY方向の黒画素のヒストグラムを取る(図4(a), (b))。

【0020】次に、図4(c)に示すように、入力された小領域のデジタル画像のY方向中央付近の1行のY方向の黒画素のヒストグラムと、X方向隣接小領域のY方向中央付近の1行のY方向の黒画素のヒストグラムをX方向に少しずつずらしながらヒストグラム比較手段500により比較していく。もし、比較して差が大きいようなら1行ずらして同様に比較を行い、差が最小の行を探すことでマッチする位置を検出して隣接小領域との位置関係を決定し、合成手段700により合成画像保存手段600にある仮想2次元空間に配置して、X方向隣接小領域と合成する。

【0021】同様に、次の小領域に分割して入力したデジタル文書画像についても同じ処理を施す。以上の処理によって、X方向にずらして入力した小領域デジタル文書画像の合成が可能である。

【0022】Y方向隣接小領域と合成を行う場合、入力された小領域のY方向隣接側の1行のY方向の黒画素のヒストグラムと、Y方向隣接小領域の1行のY方向の黒画素のヒストグラムをX方向に少しずつずらしながらヒストグラム比較手段500により比較していく。もし、比較して差が大きいようなら1行ずらして同様に比較を

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行い、差が最小の行を探すことでマッチする位置を検出して隣接小領域との位置関係を決定し、合成手段700により合成画像保存手段600にある仮想2次元空間に配置して、Y方向隣接小領域と合成する。

【0023】以上の処理により、入力手段よりも広い範囲の原稿であるために小領域に分割して入力されたデジタル文書画像から元の原稿のデジタル文書画像を自動合成することが可能になる。従って、小型な入力手段により、原稿の大きさによらず、高解像度のデジタル文書画像が自動的に得られる。

【0024】なお、上記の実施例では、横書きの原稿の場合を例に説明したが、場合により縦書きの原稿が分割して入力された場合には、横書きか縦書きかの判別を行った後に上記と同様の処理を行えばよい。その判別する方法あるいは手段としては、X方向とY方向のヒストグラムを取り、行がより明確に分離されている方向から判別する手法を用いればよい。ここで、行の分離が明確でない場合にはデジタル画像データを少し回転させて判別する。縦書きと判別された場合には、上記の実施例の説明中のX方向とY方向を読み換えた処理を行えばよい。

【0025】

【発明の効果】以上説明したように本発明の文書画像の分割入力方法および装置によれば、分割入力された小領域デジタル文書画像から自動的に元の原稿のデジタル文書画像が合成可能となる。

【0026】また、横書きか縦書きかを判別してそれに応じた原稿の分割入力処理を開始するようにすれば、原稿が縦書きの場合でも自動的に分割入力した原稿をデジタル文書画像に合成することができる。

【図面の簡単な説明】

【図1】本発明の一実施例の構成の説明図である。

【図2】上記実施例における処理フロー図である。

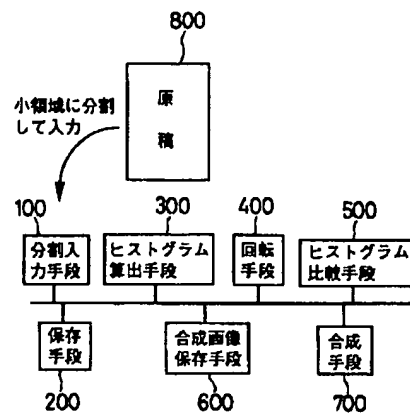
【図3】(a), (b)は上記実施例の作用を例示により説明する説明図(その1)である。

【図4】(a), (b), (c)は上記実施例の作用を例示により説明する説明図(その2)である。

【符号の説明】

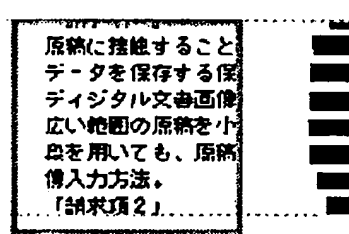
100…分割入力手段
200…保存手段
300…ヒストグラム算出手段
400…回転手段
500…ヒストグラム比較手段
600…合成画像保存手段
700…合成手段
800…原稿

【図1】



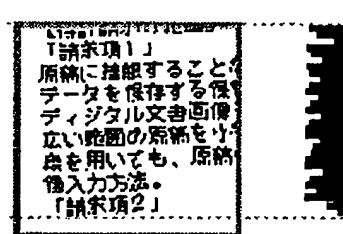
【図3】

正しく撮影した場合

X方向の黒画素
のヒストグラム

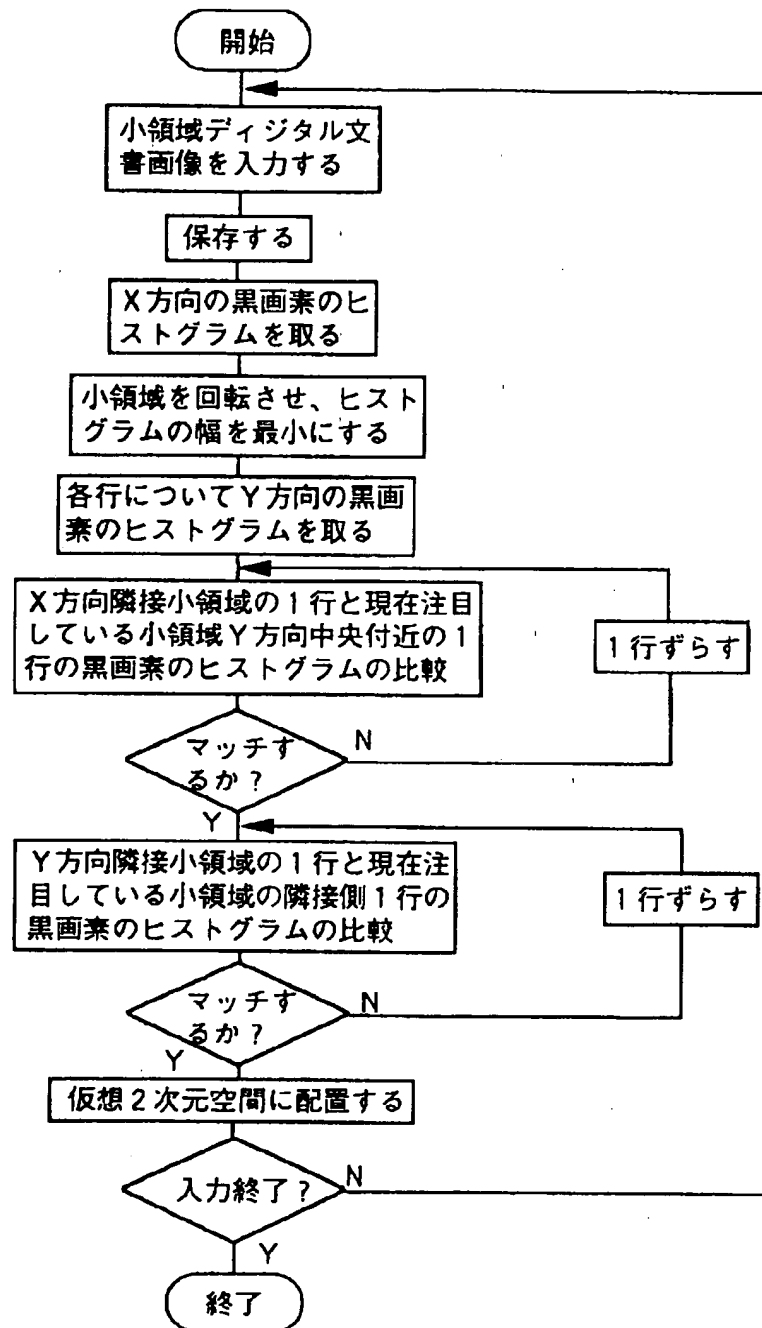
(a)

斜めにズれて撮影した場合

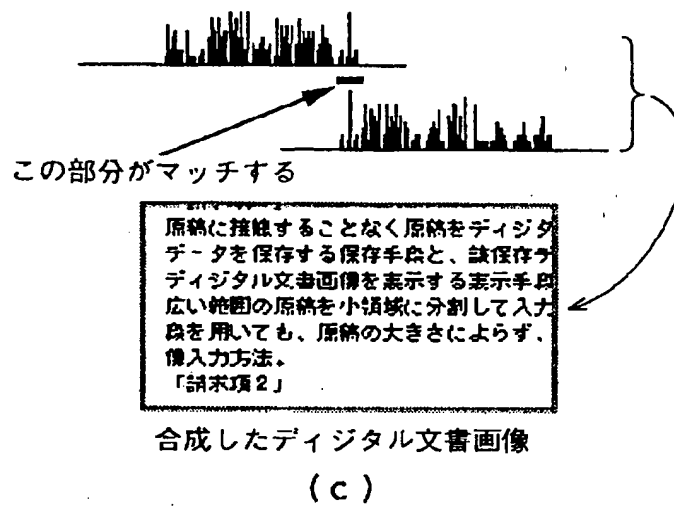
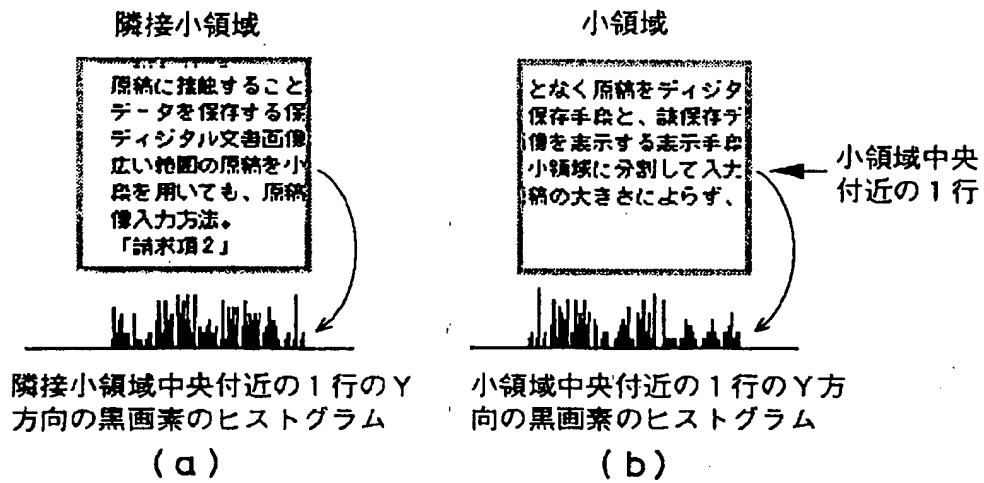
X方向の黒画素
のヒストグラム

(b)

【図2】



【図4】



PATENT ABSTRACTS OF JAPAN

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(71)Applicant : NIPPON TELEGR & TELEPH
CORP <NTT>

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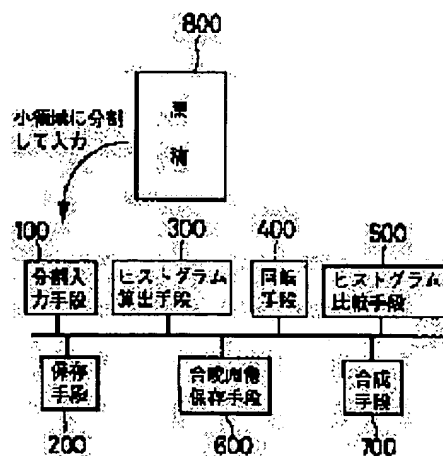
(72)Inventor : HIKAGE TOMOFUMI
MATSUKI MAKOTO
MIZUMACHI HAJIME

(54) METHOD AND DEVICE FOR DIVISIONAL INPUT OF DOCUMENT IMAGE

(57)Abstract:

PURPOSE: To automatically compose a document which is inputted as small divided areas if the output document of a printer, etc., is larger than an input means when the output document is inputted as a digital document image.

CONSTITUTION: A document 800 is divided into small areas and inputted from a divisional input means 100. Then, a histogram calculating means 300 generates a histogram of black pixels of the small areas and a rotating means 400 rotates the small-area digital document image data so that lines are separated, thereby correcting deviations of small areas at the time of the input. Then, a histogram comparing means 500 compares the histogram between adjacent small areas to detect the positional relation between the small areas. Then, a composing means 700 arranges the small-area digital document image data in a virtual two-dimensional space of a composite image storage means 600 on the basis of the position relation to compose the document. Through the processes, the digital document image of the original document can automatically be composited from the small-area digital document images which are divided



and inputted.

LEGAL STATUS

[Date of request for examination]

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[Date of final disposal for application]

[Patent number]

[Date of registration]

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CLAIMS

[Claim(s)]

[Claim 1] In the approach of inputting the manuscript beforehand outputted from the output unit as digital document image data First, it is divided and inputted into a small field, using a manuscript as digital document image data. Next, it saves for every small field which inputted said inputted small field digital document image data. Next, the histogram of the black pixel of said saved small field digital document image data is taken. Next, based on the pattern of said histogram, rotate said small field digital document image data, and gap is amended. Next, the division input approach of the document image characterized by comparing the histogram for every contiguity smallness field digital document image data which amended said gap, and detecting mutual physical relationship, next arranging said small field digital document image data to virtual two-dimensional space based on said physical relationship.

[Claim 2] The division input approach of the document image according to claim 1 characterized by performing said rotation so that the width of face of the histogram which shows a line may become min in the process which is made to rotate small field digital document image data based on the pattern of a histogram, and amends gap.

[Claim 3] The division input approach of the document image according to claim 1 characterized by determining physical relationship with a contiguity smallness field when the black pixel histograms of one line by the side of contiguity of each smallness field digital document image data are compared in the process in which compare the histogram for every contiguity smallness field digital document image data which amended gap, and mutual physical relationship is detected, shifting a line and a difference looks for the minimum line.

[Claim 4] The division input approach of the document image according to claim 1, 2, or 3 characterized by for a line distinguishing towards dissociating whether introduction and the inputted small field digital document image data are lateral writing or it is columnar writing among the histograms of both directions, and starting processing based on the result of this distinction.

[Claim 5] In the equipment which inputs the manuscript beforehand outputted from output units, such as a printer, as digital document image data A division input means to make a manuscript digital document image data, and to divide and input it into a small field, A preservation means which inputted said inputted small field digital document image data to save for every small field, A histogram calculation means to take the histogram of the black pixel of said saved small field digital document image data, A rotation means to make rotate said small field digital document image data based on the pattern of said histogram, and to amend gap, A comparison means to compare the histogram computed for every contiguity smallness field digital document image data, and to detect physical relationship with contiguity smallness field digital document image data, A synthetic means to compound by arranging said small field digital document image data to virtual two-dimensional space based on said physical relationship, The division input unit of the document image characterized by having a synthetic image preservation means to save said compounded digital document image data with said virtual two-dimensional space.

[Claim 6] A rotation means to make rotate small field digital document image data based on the pattern

of a histogram, and to amend gap is the division input unit of the document image according to claim 5 characterized by performing said rotation so that the width of face of the histogram which shows a line may become min.

[Claim 7] A comparison means to compare the histogram for every contiguity smallness field digital document image data which amended gap, and to detect mutual physical relationship is the division input unit of the document image according to claim 1 characterized by determining physical relationship with a contiguity smallness field, when the black pixel histograms of one line by the side of contiguity of each smallness field digital document image data are compared shifting a line and a difference looks for the minimum line.

[Claim 8] The division input unit of the document image according to claim 5, 6, or 7 characterized by having a direction distinction means of a document for a line to distinguish towards dissociating whether the inputted small field digital document image data is lateral writing or it is columnar writing among the histograms of both directions, and to make actuation of each part start based on the result of this distinction.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the division input approach and equipment of a digital document image which input the manuscript already outputted in output units, such as a printer, as a digital document image.

[0002]

[Description of the Prior Art] When having inputted conventionally the manuscript already outputted in output units, such as a printer, as a digital document image for the purpose of an image processing etc. and a manuscript to input was larger than the size of an input means, it needed to divide and input into the field which can be inputted with an input means, and needed to compound by handicraft.

[0003]

[Problem(s) to be Solved by the Invention] By such division input approach of the conventional digital document image, in order to compound manually after an input, there was a trouble of taking time and effort and time amount.

[0004] Then, the purpose of this invention is to offer the division input approach and equipment of a document image which compound automatically the manuscript which divided into the small field and was inputted in order to improve the above-mentioned trouble of the conventional technique.

[0005]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, by the approach of this invention In the approach of inputting the manuscript beforehand outputted from the output unit as digital document image data First, it is divided and inputted into a small field, using a manuscript as digital document image data. Next, it saves for every small field which inputted said inputted small field digital document image data. Next, the histogram of the black pixel of said saved small field digital document image data is taken. Next, based on the pattern of said histogram, rotate said small field digital document image data, and gap is amended. Next, let the division input approach of the document image which compares the histogram for every contiguity smallness field digital document image data which amended said gap, and detects mutual physical relationship, next arranges said small field digital document image data to virtual two-dimensional space based on said physical relationship be a means.

[0006] performing said rotation so that the width of face of the histogram which shows a line may become min in the process which is made to rotate small field digital document image data based on the pattern of a histogram, and amends gap in the above-mentioned approach -- implementation -- it is easy.

[0007] moreover, determining physical relationship with a contiguity smallness field, when the black pixel histograms of one line by the side of contiguity of each smallness field digital document image data are compared in the process in which compare the histogram for every contiguity smallness field digital document image data which amended gap in the above-mentioned approach, and mutual physical relationship is detected, shifting a line and a difference looks for the minimum line -- implementation -- it is easy.

[0008] Furthermore, in the above-mentioned approach, when a line distinguishing towards dissociating

whether the inputted small field digital document image data is lateral writing or it is columnar writing among the histograms of both directions, and making processing start based on the result of this distinction enables correspondence in lateral writing/columnar writing of a document, it is suitable.

[0009] In the equipment which, on the other hand, inputs the manuscript beforehand outputted from output units, such as a printer, as digital document image data with the equipment of this invention A division input means to make a manuscript digital document image data, and to divide and input it into a small field, A preservation means which inputted said inputted small field digital document image data to save for every small field, A histogram calculation means to take the histogram of the black pixel of said saved small field digital document image data, A rotation means to make rotate said small field digital document image data based on the pattern of said histogram, and to amend gap, A comparison means to compare the histogram computed for every contiguity smallness field digital document image data, and to detect physical relationship with contiguity smallness field digital document image data, A synthetic means to compound by arranging said small field digital document image data to virtual two-dimensional space based on said physical relationship, Let the division input unit of the document image of a configuration of having a synthetic image preservation means to save said compounded digital document image data with said virtual two-dimensional space be a means.

[0010] constituting a rotation means to make rotate small field digital document image data based on the pattern of a histogram, and to amend gap in above equipment so that the width of face of the histogram which shows a line may become min and said rotation may be performed -- implementation -- it is easy.

[0011] moreover, constituting so that physical relationship with a contiguity smallness field may be determined, when a comparison means compare the histogram for every contiguity smallness field digital document image data which amended gap in above equipment, and detect mutual physical relationship compares the black pixel histograms of one line by the side of contiguity of each smallness field digital document image data, shifting a line and a difference looks for the minimum line -- implementation -- it is easy.

[0012] Furthermore, in above equipment, when constituting so that it may have a direction distinction means of a document for a line to distinguish towards dissociating whether the inputted small field digital document image data be lateral writing or it be columnar writing among the histograms of both directions, and to make actuation of each part start based on the result of this distinction enable correspondence in lateral writing/columnar writing of a document, it be suitable.

[0013]

[Function] With the division input approach and equipment of a document image of this invention Divide and input a bigger manuscript than an input means into a small field, and the histogram of the black pixel of a small field is taken with a histogram calculation means etc. A rotation means etc. amends gap of the small field at the time of an input, and a histogram comparison means etc. compares the histogram between contiguity smallness fields. By detecting the physical relationship between small fields and arranging to virtual two-dimensional space, such as a synthetic image preservation means, composition of the digital document image of the original manuscript is automatically enabled from the small field digital document image by which the division input was carried out.

[0014]

[Example] Hereafter, the example of this invention is explained to a detail with reference to a drawing.

[0015] The configuration of one example of this invention is shown in drawing 1 . A division input means for 100 in drawing to divide and input a manuscript 800 into a small field, The preservation means for saving the digital document image data which divided 200 into the small field and was inputted for every small field, A histogram calculation means for 300 to take the inputted histogram of the black pixel of digital document image data, A histogram comparison means for a rotation means for 400 to amend the gap at the time of an input and 500 to compare the histogram between the inputted contiguity smallness fields, The synthetic image preservation means for saving a synthetic image with virtual two-dimensional space for 600 arranging the inputted small field digital image data, 700 expresses a synthetic means to compound the digital document image divided and inputted with contiguity smallness field digital image data, by arranging the small field digital document image data

divided and inputted to virtual two-dimensional space.

[0016] This example is characterized [main] by compounding the digital document image of the original manuscript automatically from the digital document image of a small field which divided the manuscript 800 with the division input means 100, and was inputted by the above-mentioned configuration. The point which compounds automatically the digital document image which carried out the division input differs from a Prior art.

[0017] The processing flow Fig. of this example is shown in drawing 2 . Hereafter, this example is explained to a detail according to the processing flow. Drawing 3 and drawing 4 are drawings which explain the input process of the digital document image by instantiation.

[0018] First, a manuscript is inputted as a small field digital document image with the division input means 100. Next, the black pixel histogram of the direction of X of the digital document image which divided into the small field with the histogram calculation means 300, and was inputted is taken. As shown in drawing 3 (b), when it shifts aslant and a manuscript is photoed, there is no break of the histogram which shows spacing. On the other hand, as shown in drawing 3 (a), when a photograph is taken correctly, the histogram which shows a line is separated. Then, it shifts aslant, and when a photograph is taken, it is made to rotate with the rotation means 400, and the gap at the time of an input is amended so that the width of face of a histogram may become min. It becomes separable [a line] by the above processing. Since it may not have separated from it so that instantiation of drawing 3 (b) is an extreme example and is illustrated in fact, it is made to rotate so that the width of face of a histogram may become min.

[0019] Next, by the above-mentioned processing, the line which became possible is separated and the histogram of the black pixel of the direction of Y is taken about each line (drawing 4 (a), (b)).

[0020] Next, the histogram comparison means 500 compares, shifting the histogram of the black pixel of the direction of one line of Y near the direction center of Y of the inputted digital image of a small field, and the histogram of the black pixel of the direction of one line of Y near the direction center of Y of the direction contiguity smallness field of X little by little in the direction of X, as shown in drawing 4 (c). It compares, if a difference is large, one line is shifted and it compares similarly, and the location where a difference matches by looking for the minimum line is detected, physical relationship with a contiguity smallness field is determined, and it arranges to the virtual two-dimensional space which is in the synthetic image preservation means 600 with the synthetic means 700, and compounds with the direction contiguity smallness field of X.

[0021] Processing with the same said of the digital document image divided and inputted into the next small field similarly is performed. Composition of the small field digital document image shifted and inputted in the direction of X by the above processing is possible.

[0022] When compounding with the direction contiguity smallness field of Y, the histogram comparison means 500 compares shifting the histogram of the black pixel of the direction of one line of Y by the side of the direction contiguity of Y of the inputted small field, and the histogram of the black pixel of the direction of Y of one line of the direction contiguity smallness field of Y little by little in the direction of X. It compares, if a difference is large, one line is shifted and it compares similarly, and the location where a difference matches by looking for the minimum line is detected, physical relationship with a contiguity smallness field is determined, and it arranges to the virtual two-dimensional space which is in the synthetic image preservation means 600 with the synthetic means 700, and compounds with the direction contiguity smallness field of Y.

[0023] It becomes possible to carry out automatic composition of the digital document image of the original manuscript from the digital document image divided and inputted into the small field by the above processing since it was the manuscript of the range larger than an input means. Therefore, by the small input means, it is not based on the magnitude of a manuscript but the digital document image of high resolution is obtained automatically.

[0024] In addition, what is necessary is just to perform the same processing as the above in the above-mentioned example, after performing distinction of lateral writing or columnar writing when the manuscript of columnar writing divides by the case and it is inputted although the case of the manuscript

of lateral writing was explained to the example. What is necessary is to take the histogram of the direction of X, and the direction of Y, and just to use the technique distinguished from the direction where the line is separated more clearly as the approach of distinguishing, or a means. Here, when separation of a line is not clear, a little digital image data are rotated and it distinguishes. What is necessary is just to perform processing which read and changed the direction of X and the direction of Y of [under explanation of the above-mentioned example], when distinguished from columnar writing. [0025]

[Effect of the Invention] As explained above, according to the division input approach and equipment of a document image of this invention, the digital document image of the original manuscript consists of a small field digital document image by which the division input was carried out compoundable automatically.

[0026] Moreover, if lateral writing or columnar writing is distinguished and the division input process of the manuscript according to it is started, even when a manuscript is columnar writing, the manuscript which carried out the division input automatically can be compounded in a digital document image.

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TECHNICAL FIELD

[Industrial Application] This invention relates to the division input approach and equipment of a digital document image which input the manuscript already outputted in output units, such as a printer, as a digital document image.

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PRIOR ART

[Description of the Prior Art] When having inputted conventionally the manuscript already outputted in output units, such as a printer, as a digital document image for the purpose of an image processing etc. and a manuscript to input was larger than the size of an input means, it needed to divide and input into the field which can be inputted with an input means, and needed to compound by handicraft.

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EFFECT OF THE INVENTION

[Effect of the Invention] As explained above, according to the division input approach and equipment of a document image of this invention, the digital document image of the original manuscript consists of a small field digital document image by which the division input was carried out compoundable automatically.

[0026] Moreover, if lateral writing or columnar writing is distinguished and the division input process of the manuscript according to it is started, even when a manuscript is columnar writing, the manuscript which carried out the division input automatically can be compounded in a digital document image.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] By such division input approach of the conventional digital document image, in order to compound manually after an input, there was a trouble of taking time and effort and time amount.

[0004] Then, the purpose of this invention is to offer the division input approach and equipment of a document image which compound automatically the manuscript which divided into the small field and was inputted in order to improve the above-mentioned trouble of the conventional technique.

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MEANS

[Means for Solving the Problem] In order to attain the above-mentioned purpose, by the approach of this invention In the approach of inputting the manuscript beforehand outputted from the output unit as digital document image data First, it is divided and inputted into a small field, using a manuscript as digital document image data. Next, it saves for every small field which inputted said inputted small field digital document image data. Next, the histogram of the black pixel of said saved small field digital document image data is taken. Next, based on the pattern of said histogram, rotate said small field digital document image data, and gap is amended. Next, let the division input approach of the document image which compares the histogram for every contiguity smallness field digital document image data which amended said gap, and detects mutual physical relationship, next arranges said small field digital document image data to virtual two-dimensional space based on said physical relationship be a means.

[0006] performing said rotation so that the width of face of the histogram which shows a line may become min in the process which is made to rotate small field digital document image data based on the pattern of a histogram, and amends gap in the above-mentioned approach -- implementation -- it is easy. [0007] moreover, determining physical relationship with a contiguity smallness field, when the black pixel histograms of one line by the side of contiguity of each smallness field digital document image data are compared in the process in which compare the histogram for every contiguity smallness field digital document image data which amended gap in the above-mentioned approach, and mutual physical relationship is detected, shifting a line and a difference looks for the minimum line -- implementation -- it is easy.

[0008] Furthermore, in the above-mentioned approach, when a line distinguishing towards dissociating whether the inputted small field digital document image data is lateral writing or it is columnar writing among the histograms of both directions, and making processing start based on the result of this distinction enables correspondence in lateral writing/columnar writing of a document, it is suitable.

[0009] In the equipment which, on the other hand, inputs the manuscript beforehand outputted from output units, such as a printer, as digital document image data with the equipment of this invention A division input means to make a manuscript digital document image data, and to divide and input it into a small field, A preservation means which inputted said inputted small field digital document image data to save for every small field, A histogram calculation means to take the histogram of the black pixel of said saved small field digital document image data, A rotation means to make rotate said small field digital document image data based on the pattern of said histogram, and to amend gap, A comparison means to compare the histogram computed for every contiguity smallness field digital document image data, and to detect physical relationship with contiguity smallness field digital document image data, A synthetic means to compound by arranging said small field digital document image data to virtual two-dimensional space based on said physical relationship, Let the division input unit of the document image of a configuration of having a synthetic image preservation means to save said compounded digital document image data with said virtual two-dimensional space be a means.

[0010] constituting a rotation means to make rotate small field digital document image data based on the pattern of a histogram, and to amend gap in above equipment so that the width of face of the histogram

which shows a line may become min and said rotation may be performed -- implementation -- it is easy. [0011] moreover, constituting so that physical relationship with a contiguity smallness field may be determined, when a comparison means compare the histogram for every contiguity smallness field digital document image data which amended gap in above equipment, and detect mutual physical relationship compares the black pixel histograms of one line by the side of contiguity of each smallness field digital document image data, shifting a line and a difference looks for the minimum line -- implementation -- it is easy.

[0012] Furthermore, in above equipment, when constituting so that it may have a direction distinction means of a document for a line to distinguish towards dissociating whether the inputted small field digital document image data be lateral writing or it be columnar writing among the histograms of both directions, and to make actuation of each part start based on the result of this distinction enable correspondence in lateral writing/columnar writing of a document, it be suitable.

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OPERATION

[Function] With the division input approach and equipment of a document image of this invention Divide and input a bigger manuscript than an input means into a small field, and the histogram of the black pixel of a small field is taken with a histogram calculation means etc. A rotation means etc. amends gap of the small field at the time of an input, and a histogram comparison means etc. compares the histogram between contiguity smallness fields. By detecting the physical relationship between small fields and arranging to virtual two-dimensional space, such as a synthetic image preservation means, composition of the digital document image of the original manuscript is automatically enabled from the small field digital document image by which the division input was carried out.

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EXAMPLE

[Example] Hereafter, the example of this invention is explained to a detail with reference to a drawing. [0015] The configuration of one example of this invention is shown in drawing 1. A division input means for 100 in drawing to divide and input a manuscript 800 into a small field, The preservation means for saving the digital document image data which divided 200 into the small field and was inputted for every small field, A histogram calculation means for 300 to take the inputted histogram of the black pixel of digital document image data, A histogram comparison means for a rotation means for 400 to amend the gap at the time of an input and 500 to compare the histogram between the inputted contiguity smallness fields, The synthetic image preservation means for saving a synthetic image with virtual two-dimensional space for 600 arranging the inputted small field digital image data, 700 expresses a synthetic means to compound the digital document image divided and inputted with contiguity smallness field digital image data, by arranging the small field digital document image data divided and inputted to virtual two-dimensional space.

[0016] This example is characterized [main] by compounding the digital document image of the original manuscript automatically from the digital document image of a small field which divided the manuscript 800 with the division input means 100, and was inputted by the above-mentioned configuration. The point which compounds automatically the digital document image which carried out the division input differs from a Prior art.

[0017] The processing flow Fig. of this example is shown in drawing 2. Hereafter, this example is explained to a detail according to the processing flow. Drawing 3 and drawing 4 are drawings which explain the input process of the digital document image by instantiation.

[0018] First, a manuscript is inputted as a small field digital document image with the division input means 100. Next, the black pixel histogram of the direction of X of the digital document image which divided into the small field with the histogram calculation means 300, and was inputted is taken. As shown in drawing 3 (b), when it shifts aslant and a manuscript is photoed, there is no break of the histogram which shows spacing. On the other hand, as shown in drawing 3 (a), when a photograph is taken correctly, the histogram which shows a line is separated. Then, it shifts aslant, and when a photograph is taken, it is made to rotate with the rotation means 400, and the gap at the time of an input is amended so that the width of face of a histogram may become min. It becomes separable [a line] by the above processing. Since it may not have separated from it so that instantiation of drawing 3 (b) is an extreme example and is illustrated in fact, it is made to rotate so that the width of face of a histogram may become min.

[0019] Next, by the above-mentioned processing, the line which became possible is separated and the histogram of the black pixel of the direction of Y is taken about each line (drawing 4 (a), (b)).

[0020] Next, the histogram comparison means 500 compares, shifting the histogram of the black pixel of the direction of one line of Y near the direction center of Y of the inputted digital image of a small field, and the histogram of the black pixel of the direction of one line of Y near the direction center of Y of the direction contiguity smallness field of X little by little in the direction of X, as shown in drawing 4 (c). It compares, if a difference is large, one line is shifted and it compares similarly, and the location where a

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difference matches by looking for the minimum line is detected, physical relationship with a contiguity smallness field is determined, and it arranges to the virtual two-dimensional space which is in the synthetic image preservation means 600 with the synthetic means 700, and compounds with the direction contiguity smallness field of X.

[0021] Processing with the same said of the digital document image divided and inputted into the next small field similarly is performed. Composition of the small field digital document image shifted and inputted in the direction of X by the above processing is possible.

[0022] When compounding with the direction contiguity smallness field of Y, the histogram comparison means 500 compares shifting the histogram of the black pixel of the direction of one line of Y by the side of the direction contiguity of Y of the inputted small field, and the histogram of the black pixel of the direction of Y of one line of the direction contiguity smallness field of Y little by little in the direction of X. It compares, if a difference is large, one line is shifted and it compares similarly, and the location where a difference matches by looking for the minimum line is detected, physical relationship with a contiguity smallness field is determined, and it arranges to the virtual two-dimensional space which is in the synthetic image preservation means 600 with the synthetic means 700, and compounds with the direction contiguity smallness field of Y.

[0023] It becomes possible to carry out automatic composition of the digital document image of the original manuscript from the digital document image divided and inputted into the small field by the above processing since it was the manuscript of the range larger than an input means. Therefore, by the small input means, it is not based on the magnitude of a manuscript but the digital document image of high resolution is obtained automatically.

[0024] In addition, what is necessary is just to perform the same processing as the above in the above-mentioned example, after performing distinction of lateral writing or columnar writing when the manuscript of columnar writing divides by the case and it is inputted although the case of the manuscript of lateral writing was explained to the example. What is necessary is to take the histogram of the direction of X, and the direction of Y, and just to use the technique distinguished from the direction where the line is separated more clearly as the approach of distinguishing, or a means. Here, when separation of a line is not clear, a little digital image data are rotated and it distinguishes. What is necessary is just to perform processing which read and changed the direction of X and the direction of Y of [under explanation of the above-mentioned example], when distinguished from columnar writing.

[Translation done.]

* NOTICES *

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the explanatory view of the configuration of one example of this invention.

[Drawing 2] It is a processing flow Fig. in the above-mentioned example.

[Drawing 3] (a) and (b) are explanatory views (the 1) which explain an operation of the above-mentioned example by instantiation.

[Drawing 4] (a), (b), and (c) are explanatory views (the 2) which explain an operation of the above-mentioned example by instantiation.

[Description of Notations]

100 -- Division input means

200 -- Preservation means

300 -- Histogram calculation means

400 -- Rotation means

500 -- Histogram comparison means

600 -- Synthetic image preservation means

700 -- Synthetic means

800 -- Manuscript

[Translation done.]

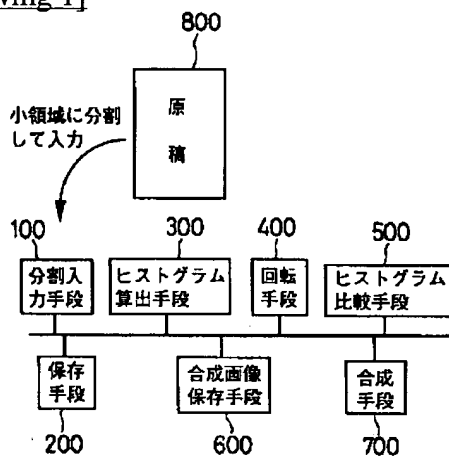
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DRAWINGS

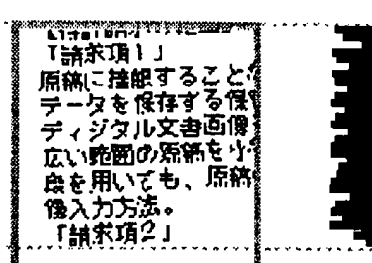
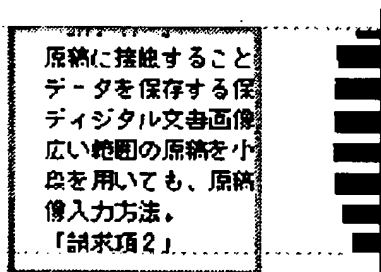
[Drawing 1]



[Drawing 3]

正しく撮影した場合

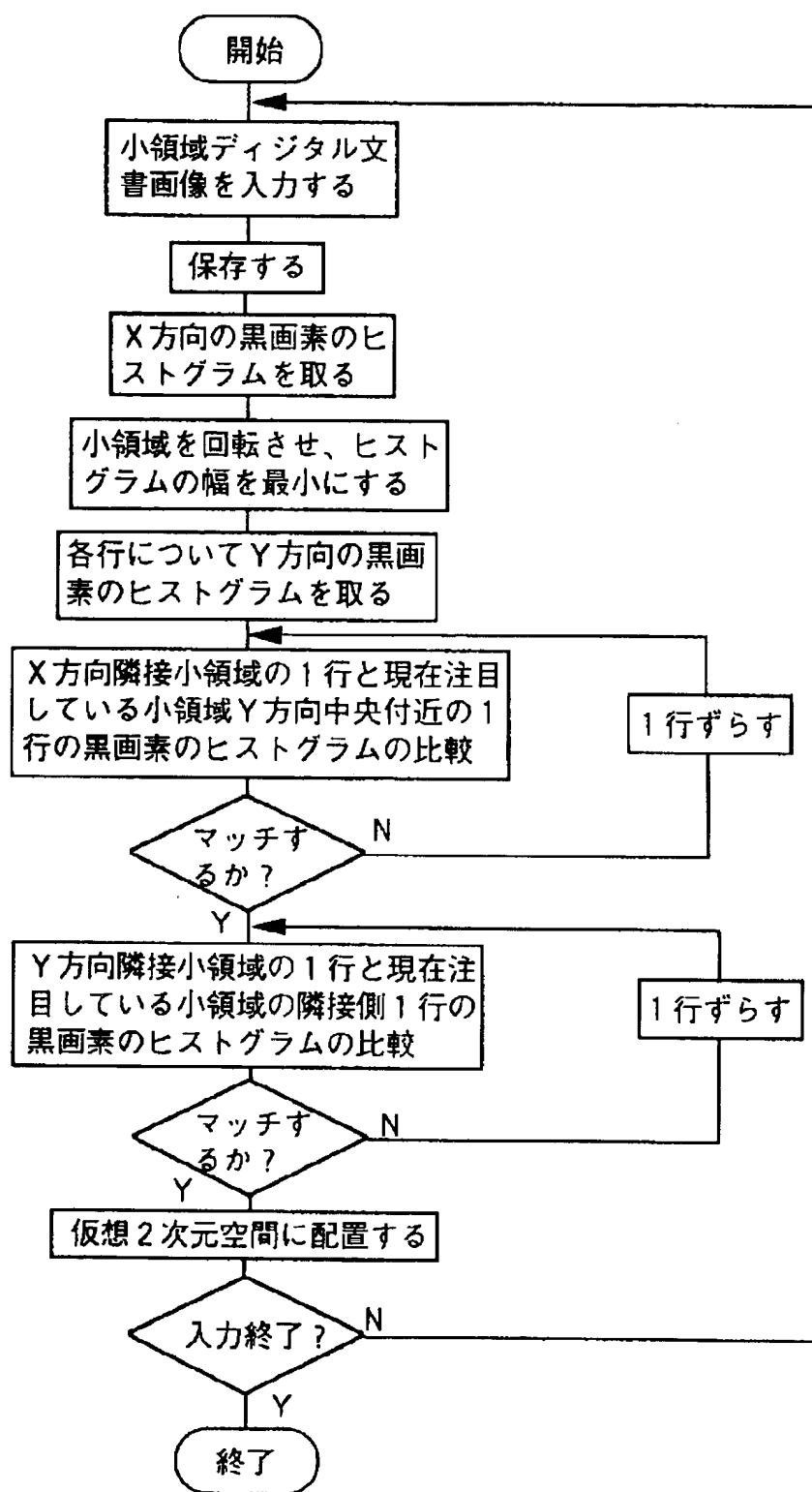
斜めにズレて撮影した場合

X方向の黒画素
のヒストグラムX方向の黒画素
のヒストグラム

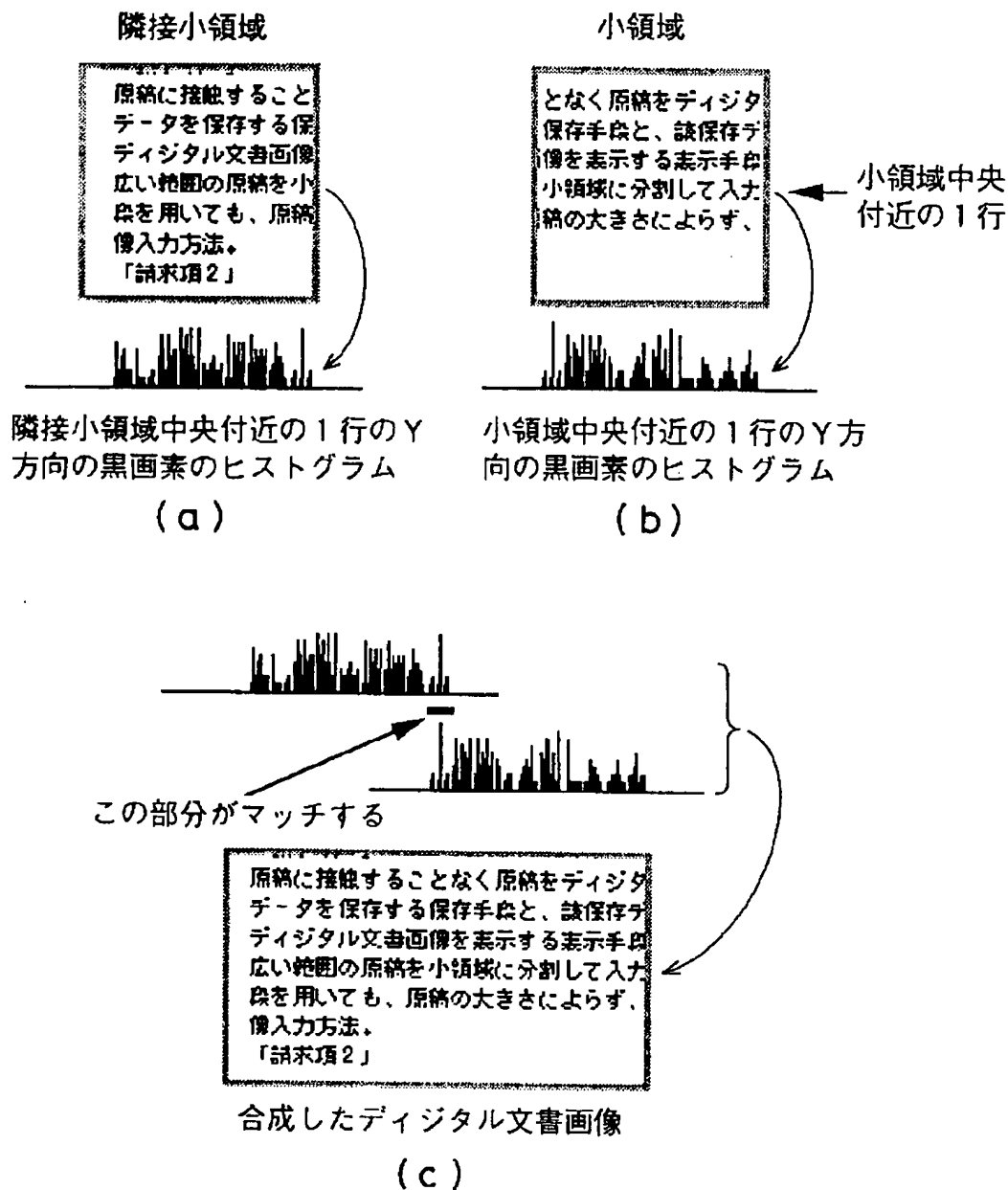
(a)

(b)

[Drawing 2]



[Drawing 4]



[Translation done.]